Jan. 3, 1928.

1,655,066

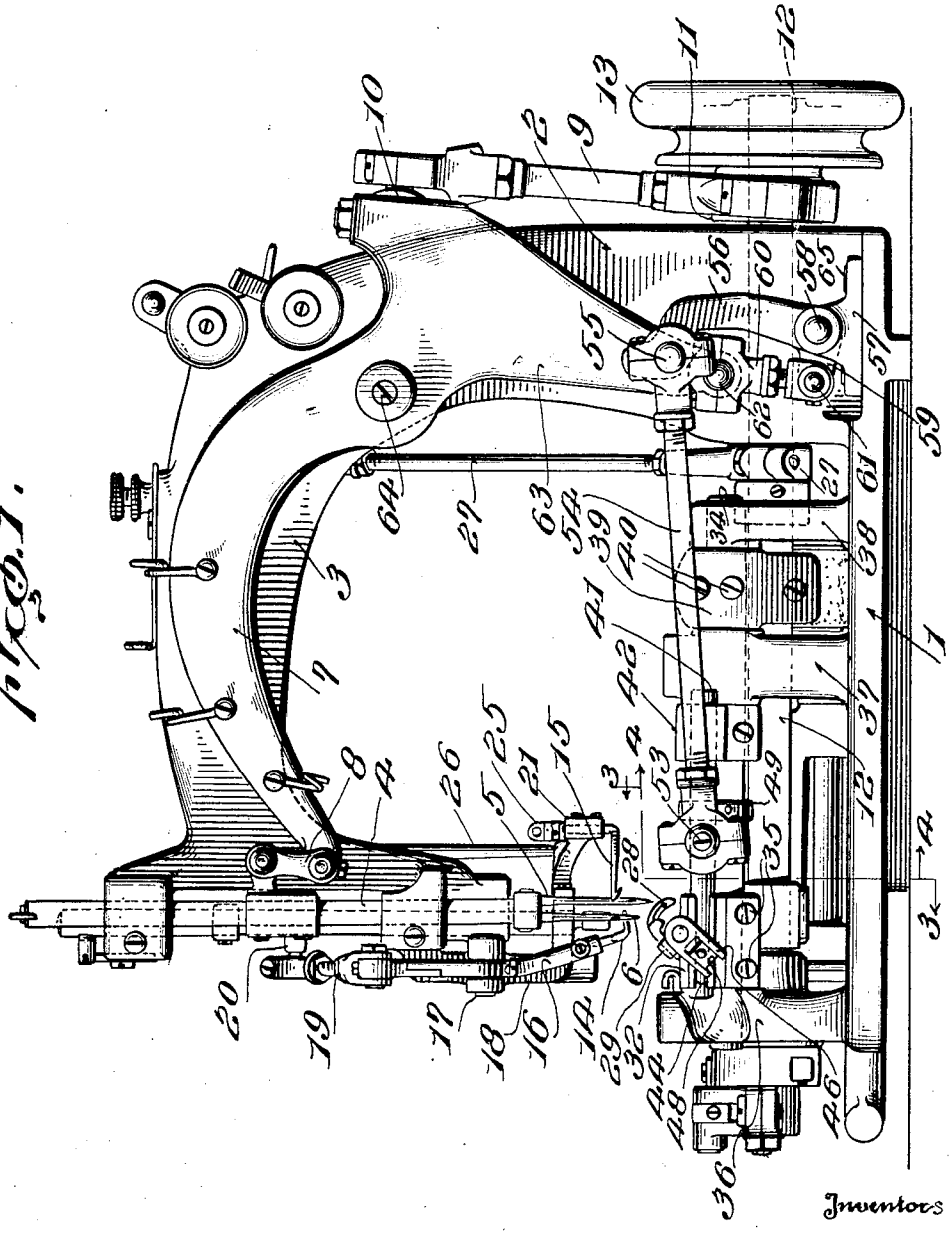
W. B. LONG ET AL

SEWING MACHINE

Filed May 19, 1924

5 Sheets-Sheet 1

Fig. 1.



Inventors

William B. Long

Nathan E. Hanson

By— Stuntevant & Mason

Attorneys

Jan. 3, 1928.

1,655,066

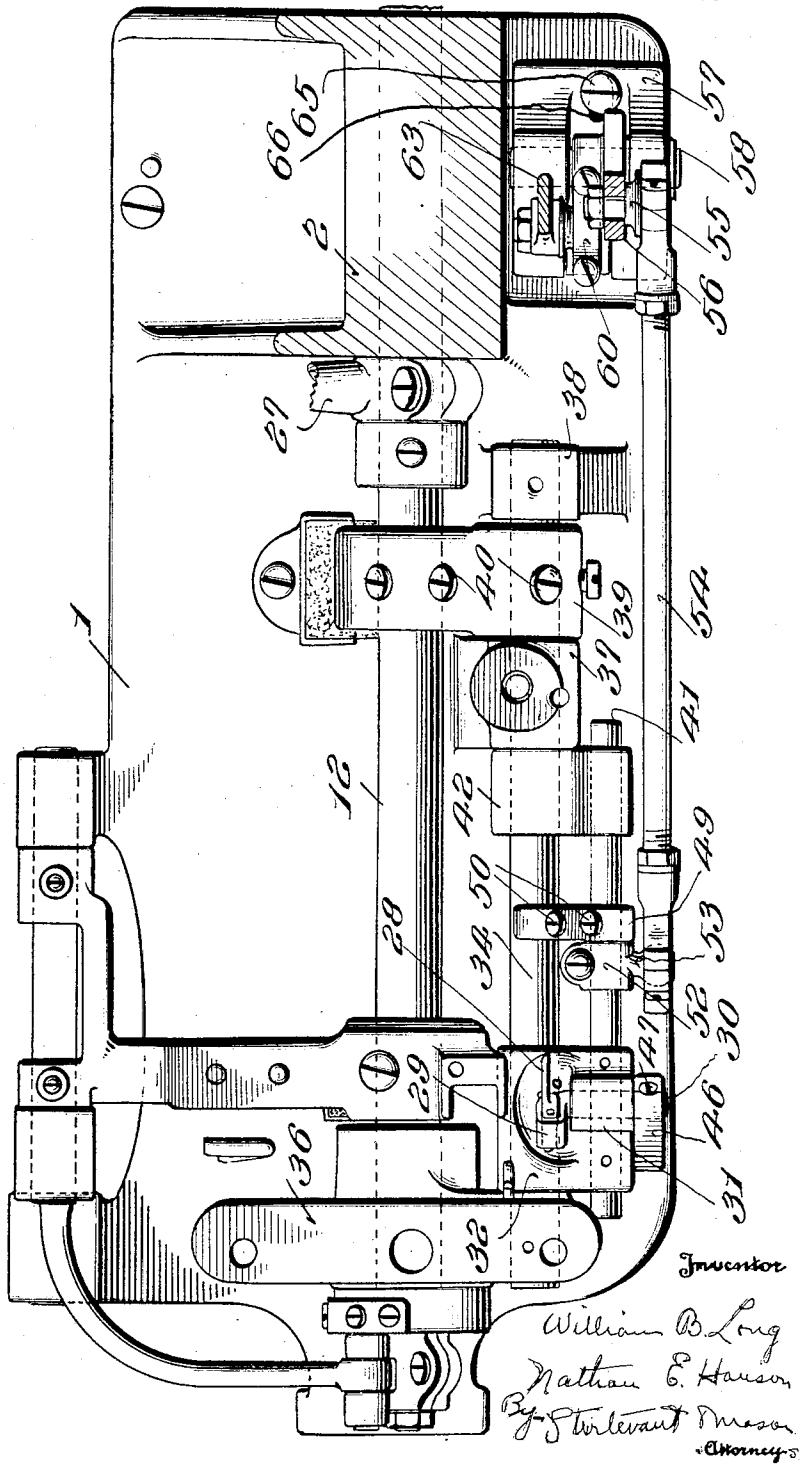
W. B. LONG ET AL

SEWING MACHINE

Filed May 19, 1924

5 Sheets-Sheet 2

Fig. 2.



Inventor

William B. Long

Nathan E. Hanson

By Sturtevant Mason

Attorneys

Jan. 3, 1928.

1,655,066

W. B. LONG ET AL

SEWING MACHINE

Filed May 19, 1924

5 Sheets-Sheet 3

Fig. 3.

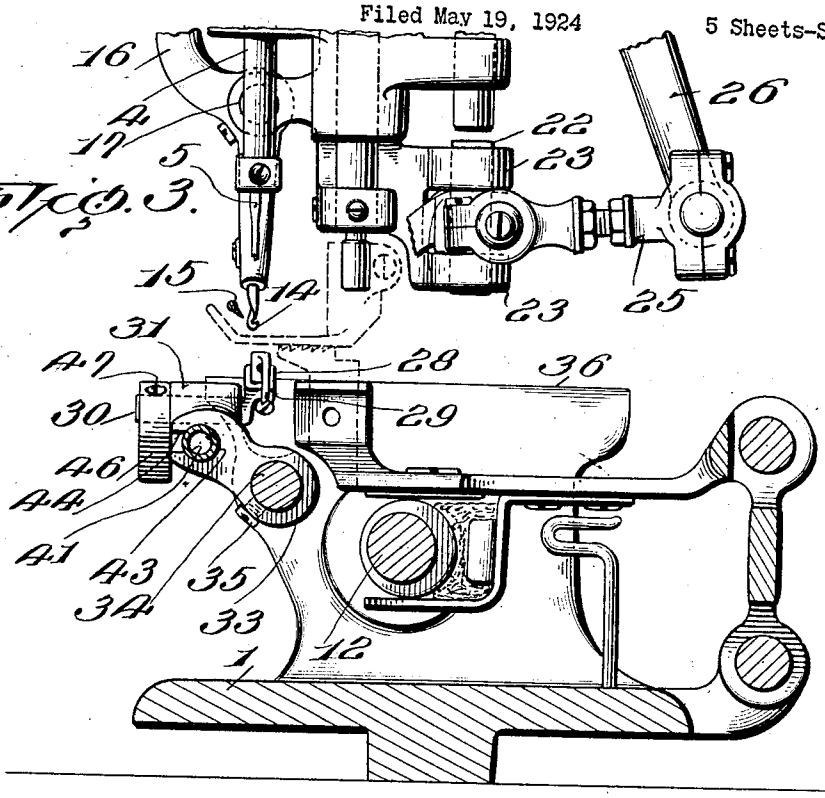
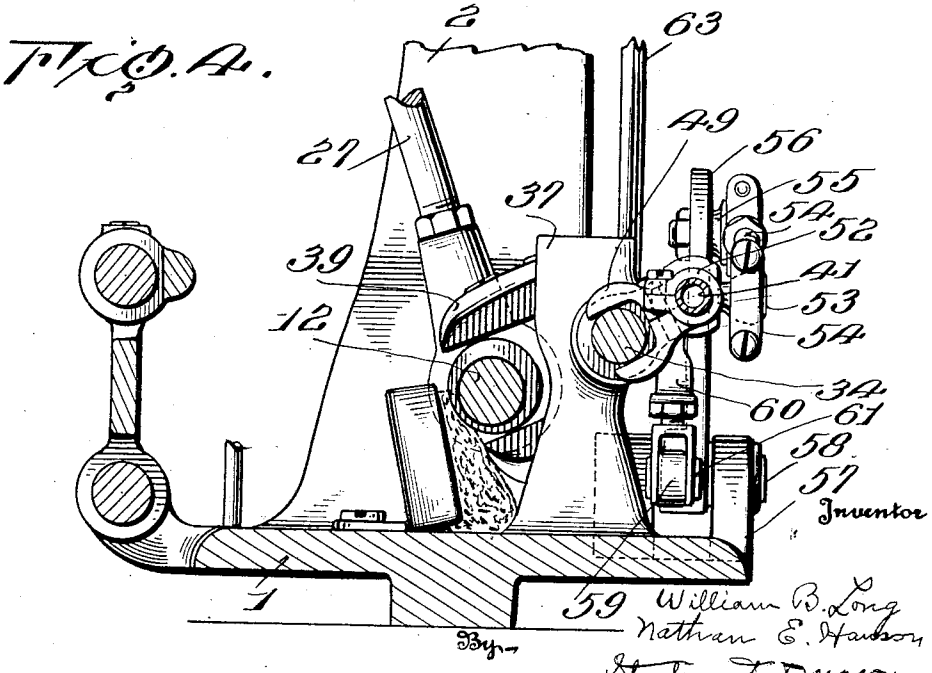


Fig. 4.



Inventor

William B. Long

Nathan E. Hanson

By—

Sturtevant & Mason

Attorneys

Jan. 3, 1928.

1,655,066

W. B. LONG ET AL

SEWING MACHINE

Filed May 19, 1924

5 Sheets-Sheet 4

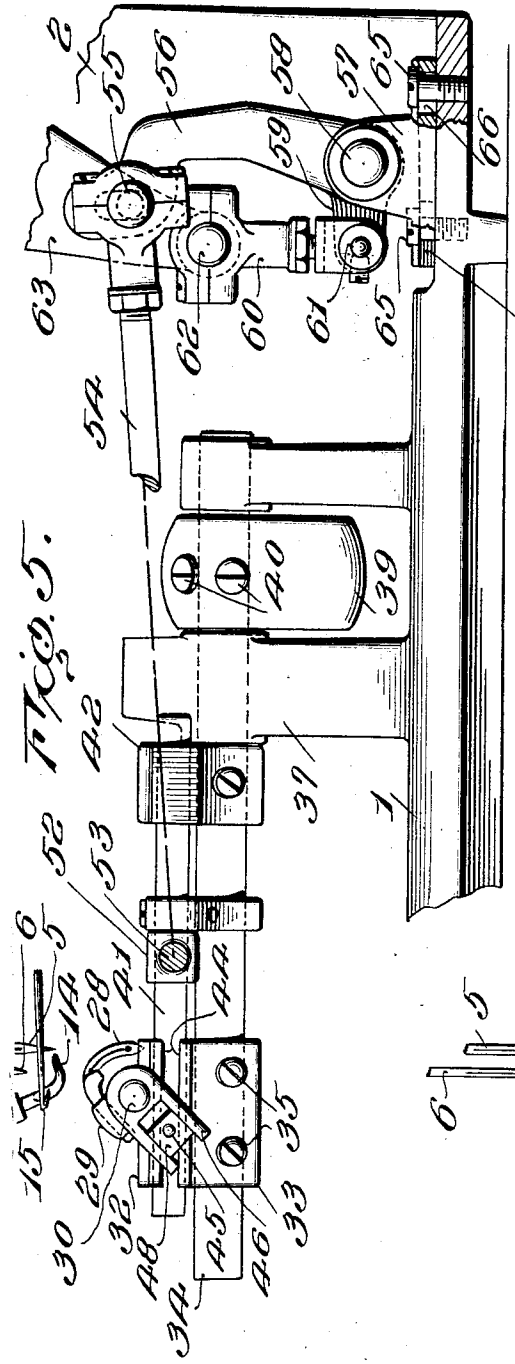


FIG. 5.

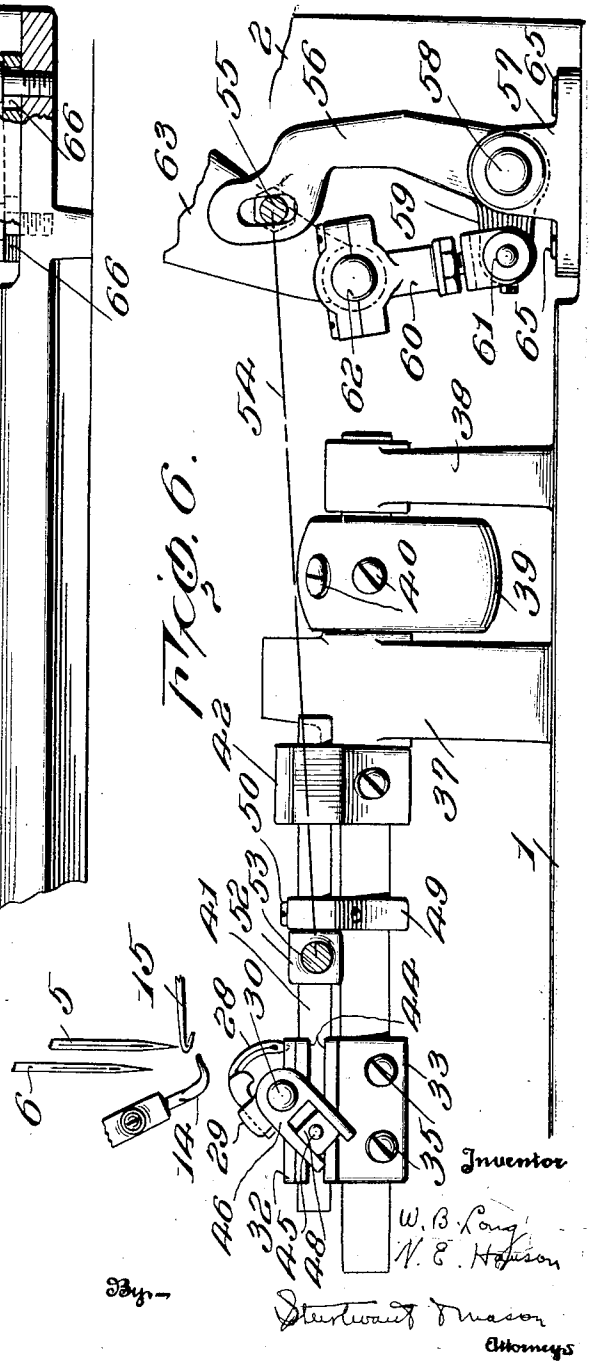


FIG. 6.

Inventor

W. B. Long

W. E. Hopson

By—

Stewart & Mason

Attorneys

Jan. 3, 1928.

1,655,066

W. B. LONG ET AL

SEWING MACHINE

Filed May 19, 1924

5 Sheets-Sheet 5

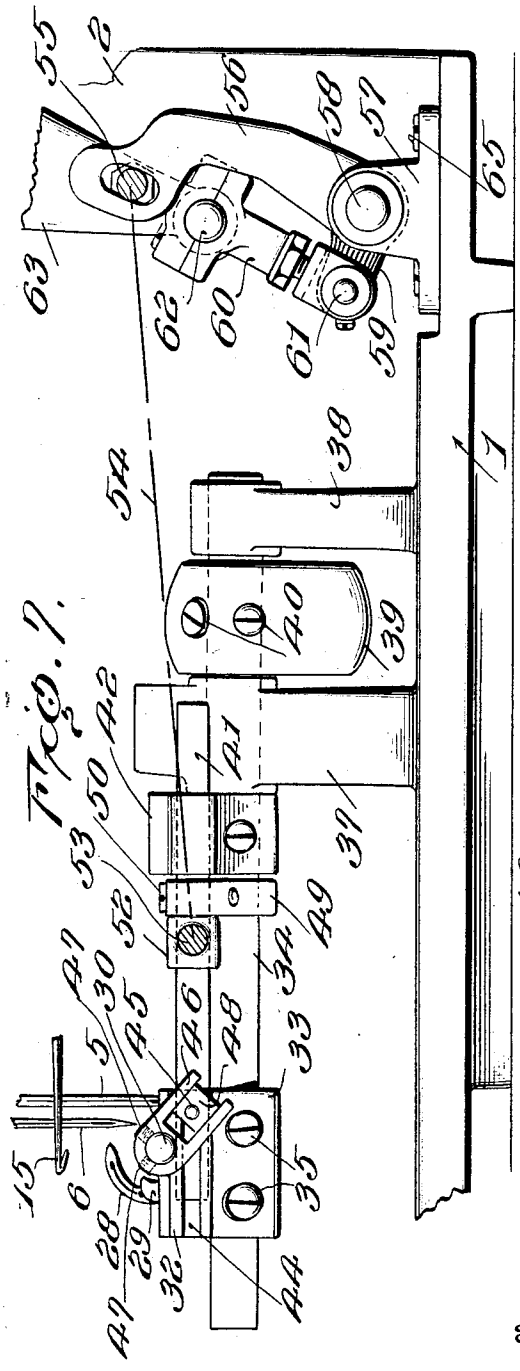


Fig. 1.

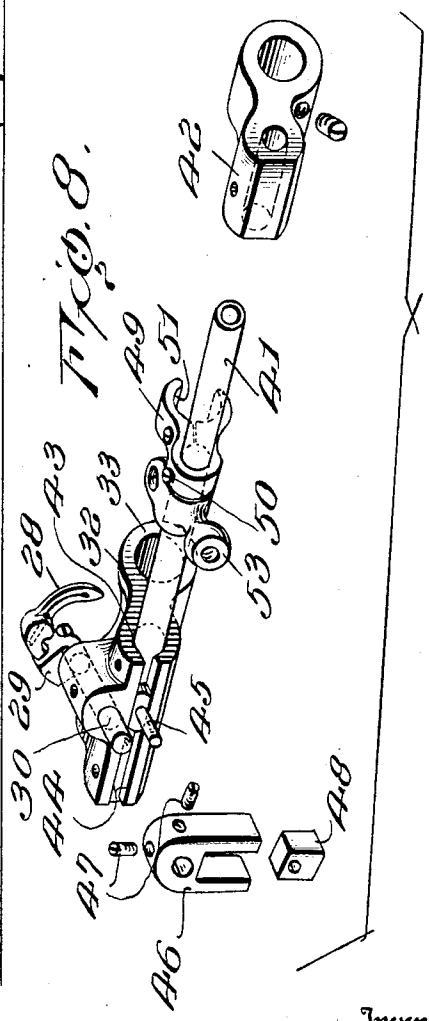


Fig. 8.

Inventor

William B. Long

Nathan E. Hadson

By— Stewart & Mason

Attorneys

Patented Jan. 3, 1928. 1,655,066

UNITED STATES PATENT OFFICE.

WILLIAM B. LONG AND NATHAN E. HANSON, OF CHICAGO, ILLINOIS, ASSIGNORS TO UNION SPECIAL MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SEWING MACHINE.

Application filed May 19, 1924. Serial No. 714,299.

The invention relates to new and useful improvements in sewing machines, and more particularly to a sewing machine for making a two-needle overedge stitch.

An object of the invention is to provide a sewing machine of the above type wherein the looper operating mechanism includes links and levers for positively moving the looper back and forth, and wherein said links and levers are arranged so as to give the looper an extended dwell at the forward end of its stroke and substantially during the period the needles are above the material.

A further object of the invention is to provide a looper operating mechanism of the above character wherein a rod is positively reciprocated back and forth and given a dwell at the outer end of its stroke, and devices are provided for converting the reciprocations of the rod into oscillations of the looper.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings which show by way of illustration one embodiment of the invention—

Figure 1 is a front view of a sewing machine embodying our improvements, the work support being omitted;

Fig. 2 is a view partly in section and partly in plan of the parts beneath the work support for operating the looper and feed;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a front view partly in section of the looper operating mechanism and with the looper at the forward end of its stroke and at the beginning of its dwell;

Fig. 6 is a similar view but with the looper at the end of its dwell;

Fig. 7 is a similar view but with the looper at the rear end of its stroke, and

Fig. 8 is a perspective view, with the parts separated, of the looper carrier, the looper, the reciprocating rod for operating the looper, and the parts for connecting the rod to the looper carrier.

The invention relates to a machine of the type shown in Patent No. 1,257,239, granted February 19, 1918, to Robert R. Hughes, Jr. The machine of this patent is intended for stitching the reed cover to the sweat band. The stitches are so formed as to extend about the edges of the reed cover and encircle the reed. The machine includes two needles, one of which passes through the reed cover and the other over the edge of the reed cover and reed. A thread hook engages the needle thread of the needle which passes through the reed cover and carries it laterally so that it is engaged by the other needle on its descent. A single thread carrying looper cooperates with both needles beneath the work support and unites the two needle thread loops. Thus it is that a very efficient and neat overedge stitch is formed resembling a whip stitch for securing the reed cover to the sweat band.

The present invention is directed particularly to an improvement in the looper operating mechanism whereby the looper is given a positive oscillation with an extended dwell at the forward end of its stroke so as to insure proper concatenation of the needles with the looper thread. This oscillation of the looper is accomplished by means of a reciprocating rod which is moved back and forth by an arrangement of links and levers which move toward and from a dead center and give to said rod an extended dwell at the outer end of its reciprocation. Devices are provided for converting the reciprocating motion of the rod into oscillations of the looper.

Referring more in detail to the drawings, our improved machine consists of a bed plate 1 from which rises a standard 2 carrying an overhanging arm 3. Mounted to reciprocate in the overhanging arm 3 is a needle bar 4 carrying two needles 5 and 6. The needle bar is reciprocated by means of a lever 7 which is connected to the needle bar by a link 8. This lever 7 receives its oscillations from an eccentric strap 9 which is attached to a ball stud 10 at its upper end and cooperates with an eccentric 11 at its lower end. The eccentric is mounted on the main shaft 12 which is driven by a suitable belt wheel 13. The two needles are arranged so that the needle 6 passes through the material while the needle 5 passes outside the edges of the material.

A thread finger 14 moves across the path

of the needle 6 prior to the descent of the needle and engages the thread of said needle and moves the same toward the front of the machine. A thread hook 15 moving back and forth in a path at right angles to the edge of the material engages the thread of the needle 6 and carries it over to a position where the needle 5 will enter the same. This thread hook and thread finger in principle of operation are the same as those shown in the patent to Hughes above referred to. The thread finger 14 is carried by a lever 16, which lever is pivoted at 17 to a bracket 18 carried by the head of the machine. The lever 16 is oscillated by means of a link 19 which is pivoted to the upper end of the lever and also to a stud 20 carried by the needle bar. The hook 15 is mounted on the outer end of a lever 21 which is pivoted on a short shaft 22 mounted in bearings 23 formed in the bracket 18. This lever 21 also carries a ball stud which is connected by a link 25 to an arm 26. The arm 26 is attached to a shaft at the rear of the machine, which shaft is oscillated by means of an eccentric strap 27. It will be noted that both the lever for oscillating the finger and the lever for oscillating the hook are mounted in the same bracket 18. This particular mounting of the thread handling mechanism above the work support forms no part of the present invention, but is shown, described and claimed in our copending application Serial No. 714,300, filed of even date herewith.

Cooperating with the needles beneath the work support is a thread carrying looper 28. Said thread carrying looper 28 is mounted in a looper carrier 29. The looper carrier 29 is fixed to the end of a short shaft 30 mounted to oscillate in a bearing 31 formed as a part of the looper support 32. The looper support 32 includes a sleeve 33 mounted on the looper supporting shaft 34 and rigidly secured thereto by screws 35, 35. This shaft 34 is journaled in brackets 36, 37 and 38, all of which are formed integral with the bed plate 1 of the machine. Mounted on the looper supporting shaft 34 and between the brackets 37 and 38 is a yoke arm 39 which is fixed to the looper supporting shaft by means of set screws 40, 40. This yoke straddles an eccentric on the main shaft 12 and as the main shaft rotates, it will oscillate the yoke, and the yoke will in turn oscillate the looper supporting shaft 34 and this oscillates the looper support 32 and bodily rocks the carrier 29 for the looper, bodily carrying the looper from one side of the needles to the other for the needle avoiding movement of the looper.

The looper is oscillated by means of a reciprocating rod 41 which is mounted to reciprocate in a bearing arm 42 rigidly secured to the looper supporting shaft 34 and in the looper carrier support 32. The looper carrier support is formed with a cylindrical recess 43 in which said rod 41 moves back and forth. The carrier is slotted at 44 so that the recess 43 is open at the front side thereof. Mounted on the rod 41 is a pin 45 which projects outwardly through the slot 44. Said pin has a shank extending into the slot and sliding back and forth therein. On the outer end of the shaft 30 there is a yoke 46 which is secured to the shaft 30 by means of set screws 47, 47. Mounted on the pin 45 is a block 48 which is free to oscillate on the pin, and this block is engaged by the forked end of the yoke 46. As the rod 41 moves back and forth, it will move the block along the slot and will cause the yoke 46 to oscillate. The oscillations of the yoke, of course, will be transmitted to the looper. By the above mechanism, we are able to convert the reciprocating motions of the rod 41 into oscillating motions from the looper. The pin 45 prevents the rod 41 from oscillating in its bearings, and as a further means for holding the rod from oscillating, we have provided the yoke arm 49 which fits on the rod and is secured thereto by a set screw 50. The inner end 51 of this yoke arm straddles the looper supporting shaft 34 as clearly shown in Fig. 2 of the drawings. It will be noted that the block 48 sliding in the forked arm or yoke 46 moves back and forth with the rod on which it is mounted and therefore it moves in a straight line. This block moves radially of the axis of the looper and is farther from the axis of the looper when the looper is at the ends of its stroke than when the looper is passing through the intermediate portion of its stroke. The purpose of this radial sliding movement of the block on the looper is to give the looper a much higher ratio of speed when at mid-travel than when approaching the ends of its stroke. When the looper in its oscillation is approaching the ends of its stroke the block is retreating or moving away from the axis and when the looper is approaching the center point in its path of oscillation the block is moving toward the axis. This gives the looper a much higher speed in mid-travel and when entering and leaving the needle thread loop.

Mounted on the rod 41 is a sleeve 52 which carries a ball stud 53. A link 54 engages at its outer end the ball stud 53. The inner end of this link engages a ball stud 55 carried by the upper end of a lever 56. The lever 56 is pivoted to a bracket 57 at 58 in turn mounted on the bed plate 1 of the machine. This lever 56 has an arm 59 extending outwardly therefrom, which arm is substantially horizontal. A link 60 is pivoted at 61 to the arm 59. Said link is also pivoted to a ball stud 62 mounted on the lower end of the needle lever extension 63.

The needle lever oscillates about a fulcrum stud 64, and as it oscillates, the stud 62 at the lower end of the needle lever extension will move across a line passing through the fulcrum 64 of the needle lever and the pivot point 61, which joins the link 60 to the arm 59 of the lever 56. When the looper is at the rear end of its stroke as shown in Fig. 7, the ball stud 62 will be on the righthand side of this line. When the looper first reaches the forward end of its stroke, this ball stud 62 will be close to and about to cross said line, so that the forward movement of the looper will cease. As the needle lever extension continues to move on to the position shown in Fig. 6, little or no movement will be imparted to the arm 58 by reason of the fact that this ball stud approaches and moves past dead center a very short distance, and while near the dead center position, no endwise movement will be imparted to the link 60. In Fig. 5, we have shown the parts with the looper just reaching the forward end of its stroke and where the dwell begins. The needles are on their up-stroke and are just a short distance above the material. The looper will remain at a dwell at the forward end of its stroke or substantially so while the needles are going on to the upper end of their strokes, and until they return to a point just above the material.

As has been stated above, the dwell begins when the parts are in the position shown in Fig. 5, and this dwell will continue until the parts have moved to the position shown in Fig. 6, and back again to the position shown in Fig. 5. Then it is that the ball stud 62 will move to the other side of the line passing through the pivot pin 61 and the fulcrum pin 64 of the needle lever, and will move the rod 41 toward the righthand end of its stroke, and this retracts the looper.

From the above it will be apparent that we have provided means for reciprocating the rod 41 and giving an extended dwell thereto when at the lefthand end of its stroke, and we have also provided means for converting the reciprocations of this rod into oscillating movements in the looper. The means for moving the rod 41 consists of links and levers positively connected together so as to give a positive back and forth movement to said rod, and at the same time, give an extended dwell to the rod at one end of its stroke, and this reciprocating movement of the rod is positively transferred to the looper by means of the oscillating yoke which is rigidly attached to the looper carrying shaft, and we are able by this mechanism to drive the machine at a very high speed, moving the looper quickly forward into the needle loop, giving an extended dwell to the looper while in the needle loop, and then quickly retracting the looper. By this quick short movement of the looper, very little looper thread is drawn off and no special looper thread handling mechanism is necessary. It will be noted that the bracket 57 is secured to the bed plate 1 by means of screws 65 which pass through slots 66 in the bracket. These slots are elongated so as to permit the bracket 57 to be shifted either to the right or left. The shifting of the bracket will move the position of the pivot point 61 and this will vary the time when the parts reach dead center, and thus vary the length of the dwell of the looper at the forward end of its stroke.

While we have described our improved looper operating mechanism as especially adapted for a hat sweat sewing machine, it will be understood that this looper mechanism may be used for other purposes in the sewing machine art wherever it is desired to use a looper having a relatively short path of movement with the quick forward and backward movements and the extended dwell at the front end of its stroke.

It is obvious, therefore, that minor changes in the details of construction and the arrangement of the parts may be made without departing from the spirit of the invention as set forth in the appended claims.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent, is—

1. A sewing machine including a needle, a thread carrying looper cooperating with said needle, a shaft, means at one end of said shaft for supporting said looper, a member, means for supporting said member whereby the same may be moved back and forth in the same path, and in a path which approaches the axis of said shaft, and moves away from the same between the ends of its movements, a member carried by the other end of the shaft supporting the looper and projecting radially from the axis of the shaft, and means for connecting said movable member to said radially projecting member for oscillating the shaft, said connecting means having a movement on the radial member toward and from the axis of the shaft.

2. In a sewing machine, a pair of needles, a thread carrying looper cooperating with said needles, means for pivotally supporting said thread carrying looper, and means for oscillating said support for the looper for moving the looper into and out of the needle thread loops, including a rod reciprocating back and forth in a line at one side of the axis of the looper, and means for connecting said rod to said looper, said connecting means being movable with the rod and having a radial sliding connection with the looper support, said rod being positioned relative to the looper support so that the connection between the rod and the looper

support moves toward and away from the axis of the looper support during the oscillations of the looper.

3. In a sewing machine, a pair of needles, a thread carrying looper cooperating with said needles, means for pivotally supporting said thread carrying looper, means for oscillating said support for the looper for moving the looper into and out of the needle thread loops, including a rod reciprocating back and forth in a line at one side of the axis of the looper, a radial arm connected to said support for the looper, a block carried by said rod and having a radial sliding connection with said arm, said block being so disposed that during the reciprocations of the rod, the block moves toward and from the axis of the looper during each oscillation thereof.

4. A sewing machine including a pair of needles, a thread carrying looper cooperating with said needles, a shaft on which said looper is mounted, a support for said shaft, means for oscillating said support for giving said looper a needle avoiding movement, and means for oscillating the looper into and out of the needle thread loops including a rod reciprocating back and forth in a line at one side of the axis of the looper, and mounted so as to oscillate with said looper in its needle avoiding movement, a block pivotally connected to said rod and movable back and forth therewith, a radially slotted arm carried by the looper in which said block slides, said block during the reciprocations of the rod being movable toward and from the axis of the looper during each oscillation of the looper.

5. In a sewing machine, a pair of needles, a thread carrying looper cooperating with said needles, a shaft on which said looper is mounted, a carrier in which said shaft is supported, a rod reciprocating back and forth in said carrier and in a line parallel with the plane of oscillation of the looper, means for reciprocating said rod and giving a dwell thereto at one end of its stroke, a forked arm carried by said looper supporting shaft, a block pivoted to said rod and engaging said forked arm whereby the reciprocations of the rod are converted into oscillations of the looper.

6. A sewing machine including in combination, a needle, a thread carrying looper cooperating with said needle, a shaft on which said looper is mounted, a looper carrier in which said shaft is mounted, a support for said carrier, means for oscillating said support, an arm projecting from said support, a rod reciprocating in said arm and said looper carrier, means for reciprocating said rod and giving a dwell thereto at one end of its stroke, a block pivoted to the rod, and a forked arm carried by the shaft supporting the looper and engaging said block whereby the reciprocations of the rod will oscillate the looper shaft.

7. A sewing machine including in combination, a needle, a thread carrying looper cooperating with said needle, a shaft on which said looper is mounted, a looper carrier in which said shaft is mounted, a support for said carrier, means for oscillating said support, an arm projecting from said support, a rod reciprocating in said arm and said looper carrier, means for reciprocating said rod and giving a dwell thereto at one end of its stroke, a block pivoted to the rod, a forked arm carried by the shaft supporting the looper and engaging said block whereby the reciprocations of the rod will oscillate the looper shaft, and means carried by said rod and engaging said support for preventing said rod from oscillating during its reciprocations.

8. A sewing machine including in combination, a plurality of needles, a needle lever for reciprocating said needles, said needle lever having an extension, a thread carrying looper cooperating with said needles beneath the work support, a thread hook cooperating with the needles above the work support, a shaft on which said looper is mounted, a looper carrier in which the shaft is mounted, a support to which said carrier is fixed, an arm parallel with the carrier and fixed to said support, a rod reciprocating in said arm and in said carrier, said looper carrier having a slot extending lengthwise of the reciprocating rod, a pivot mounted in said rod and extending outwardly through said slot, means carried by the rod and engaging the support for preventing the rod from oscillating, a forked arm carried by the shaft supporting the looper, a block mounted on the pivot and engaging said forked arm, whereby the reciprocations of the rod are converted into oscillations of the looper, a rock lever, a link connecting said rock lever to said rod, and a link connecting said rock lever to the needle lever extension, said last-named link and needle lever extension being arranged so as to move into alinement when the looper is at the forward end of its stroke whereby an extended dwell is given to said looper.

9. A sewing machine including in combination, a plurality of needles, a thread carrying looper co-operating with said needles, a shaft on which said looper is mounted, a looper carrier in which said shaft is mounted, said looper carrier having a bearing sleeve, a supporting shaft on which the looper carrier is mounted, means for oscillating said shaft for swinging the looper carrier so as to give a needle avoiding movement to the looper, an arm rigidly secured to said supporting shaft and having a bearing sleeve in alinement with the bearing sleeve in the looper carrier, a rod reciprocat-

ing in said bearing sleeves, said rod having a pivoted block carried thereby, a forked arm attached to the shaft of the looper and straddling said block, so that the reciprocations of the rod oscillate the looper.

10. A sewing machine including in combination, a plurality of needles, a thread carrying looper co-operating with said needles, a shaft on which said looper is mounted, a looper carrier in which said shaft is mounted, said looper carrier having a bearing sleeve, a supporting shaft on which the looper carrier is mounted, means for oscillating said shaft for swinging the looper carrier so as to give a needle avoiding movement to the looper, an arm rigidly secured to said supporting shaft and having a bearing sleeve in alinement with the bearing sleeve in the looper carrier, a rod reciprocating in said bearing sleeves, said rod having a pivoted block carried thereby, a forked arm attached to the shaft of the looper and straddling said block, so that the reciprocations of the rod oscillate the looper, an arm rigidly secured to said reciprocating rod and slidingly engaging said support for the looper carrier for preventing said rod from oscillating during its reciprocations.

11. A sewing machine including in combination, a plurality of needles, a thread carrying looper co-operating with said needles, a shaft on which said looper is mounted, a looper carrier in which said shaft is mounted, said looper carrier having a bearing sleeve, a supporting shaft on which the looper carrier is mounted, means for oscillating said shaft for swinging the looper carrier so as to give a needle avoiding movement to the looper, an arm rigidly secured to said supporting shaft and having a bearing sleeve in alinement with the bearing sleeve in the looper carrier, a rod reciprocating in said bearing sleeves, said rod having a pivoted block carried thereby, a forked arm attached to the shaft of the looper and straddling said block, so that the reciprocations of the rod oscillate the looper, said block being so disposed on the reciprocating rod as to move from a point at one side of the looper supporting shaft to a point at the other side thereof.

In testimony whereof, we affix our signatures.

WILLIAM B. LONG.
NATHAN E. HANSON.